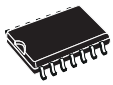
查询74LCX14MTR供应商

# 74LCX14

## LOW VOLTAGE CMOS HEX SCHMITT INVERTER WITH 5V TOLERANT INPUTS

- 5V TOLERANT INPUTS
- HIGH SPEED :
  $t_{PD}$ = 5.0ns (MAX.) at $V_{CC}$ = 3V
- POWER DOWN PROTECTION ON INPUTS AND OUTPUTS
- SYMMETRICAL OUTPUT IMPEDANCE:
  $|I_{OH}| = I_{OL}$ = 24mA (MIN) at $V_{CC}$ = 3V
- PCI BUS LEVELS GUARANTEED AT 24 mA
- BALANCED PROPAGATION DELAYS:
  $t_{PLH} \cong t_{PHL}$
- OPERATING VOLTAGE RANGE:
  $V_{CC}$(OPR) = 2.0V to 3.6V (1.5V Data Retention)
- PIN AND FUNCTION COMPATIBLE WITH 74 SERIES 14
- LATCH-UP PERFORMANCE EXCEEDS 500mA (JESD 17)
- ESD PERFORMANCE:
  HBM > 2000V (MIL STD 883 method 3015);
  MM > 200V



SOP

TSSOP

### ORDER CODES

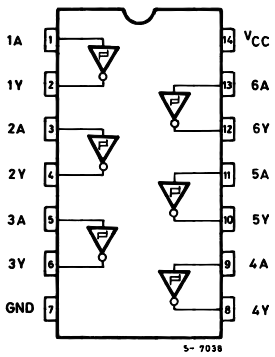
| PACKAGE | TUBE | T & R |
|---|---|---|
| SOP | 74LCX14M | 74LCX14MTR |
| TSSOP | | 74LCX14TTR |

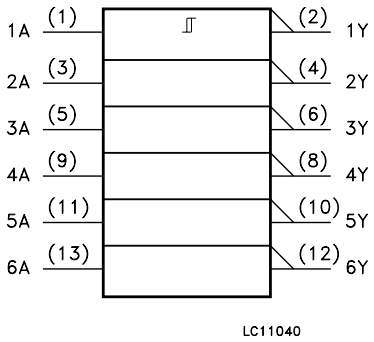
### DESCRIPTION

The 74LCX14 is a low voltage CMOS HEX SCHMITT INVERTER fabricated with sub-micron silicon gate and double-layer metal wiring $C^2MOS$ technology. It is ideal for low power and high speed 3.3V applications. It can be interfaced to 5V signal environment for inputs

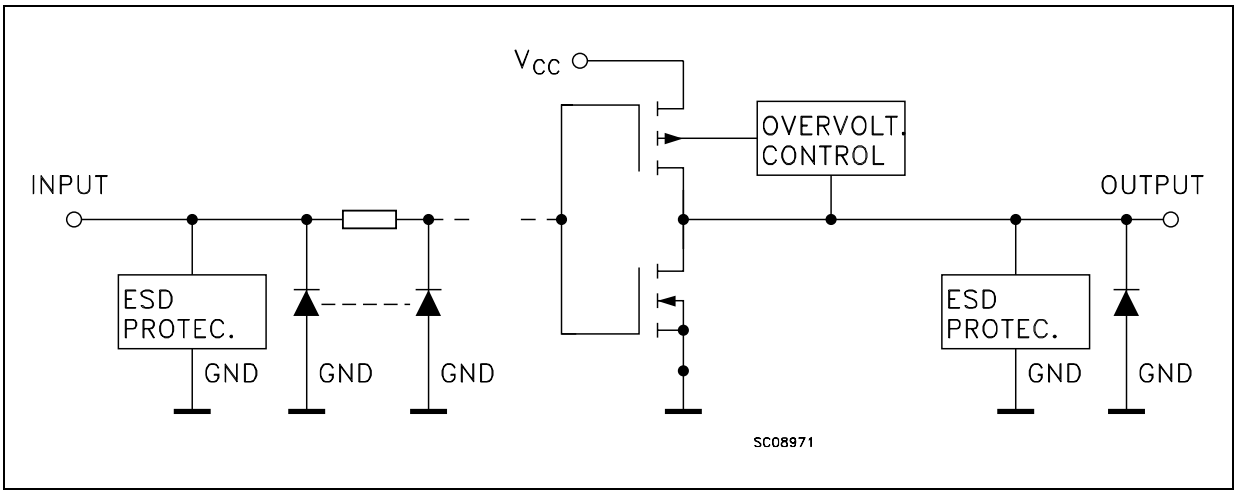
It has same speed performance at 3.3V than 5V AC/ACT family, combined with a lower power consumption.
Pin configuration and function are the same as those of the 74LCX04 but the 74LCX14 has hysteresis between the positive and negative input threshold typically of 0.8V.
This together with its schmitt trigger function allows it to be used on line receivers with slow rise/fall input signals.
All inputs and outputs are equipped with protection circuits against static discharge, giving them 2KV ESD immunity and transient excess voltage.

### PIN CONNECTION AND IEC LOGIC SYMBOLS



## INPUT AND OUTPUT EQUIVALENT CIRCUIT




## PIN DESCRIPTION

| PIN No | SYMBOL | NAME AND FUNCTION |
|---|---|---|
| 1, 3, 5, 9 ,11, 13 | 1A to 6A | Data Inputs |
| 2, 4, 6, 8, 10, 12 | 1Y to 6Y | Data Outputs |
| 7 | GND | Ground (0V) |
| 14 | $V_{CC}$ | Positive Supply Voltage |

## TRUTH TABLE

| A | Y |
|---|---|
| L | H |
| H | L |

## ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CC}$ | Supply Voltage | -0.5 to +7.0 | V |
| $V_I$ | DC Input Voltage | -0.5 to +7.0 | V |
| $V_O$ | DC Output Voltage ($V_{CC}$ = 0V) | -0.5 to +7.0 | V |
| $V_O$ | DC Output Voltage (High or Low State) (note 1) | -0.5 to $V_{CC}$ + 0.5 | V |
| $I_{IK}$ | DC Input Diode Current | - 50 | mA |
| $I_{OK}$ | DC Output Diode Current (note 2) | - 50 | mA |
| $I_O$ | DC Output Current | ± 50 | mA |
| $I_{CC}$ | DC Supply Current per Supply Pin | ± 100 | mA |
| $I_{GND}$ | DC Ground Current per Supply Pin | ± 100 | mA |
| $T_{stg}$ | Storage Temperature | -65 to +150 | °C |
| $T_L$ | Lead Temperature (10 sec) | 300 | °C |

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied
1) $I_O$ absolute maximum rating must be observed
2) $V_O$ < GND

## RECOMMENDED OPERATING CONDITIONS

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CC}$ | Supply Voltage (note 1) | 2.0 to 3.6 | V |
| $V_I$ | Input Voltage | 0 to 5.5 | V |
| $V_O$ | Output Voltage ($V_{CC}$ = 0V) | 0 to 5.5 | V |
| $V_O$ | Output Voltage (High or Low State) | 0 to $V_{CC}$ | V |
| $I_{OH}$, $I_{OL}$ | High or Low Level Output Current ($V_{CC}$ = 3.0 to 3.6V) | ± 24 | mA |
| $I_{OH}$, $I_{OL}$ | High or Low Level Output Current ($V_{CC}$ = 2.7V) | ± 12 | mA |
| $T_{op}$ | Operating Temperature | -55 to 125 | °C |

1) Truth Table guaranteed: 1.5V to 3.6V

## DC SPECIFICATIONS

| Symbol | Parameter | Test Condition | | Value | | | | Unit |
|---|---|---|---|---|---|---|---|---|
| | | $V_{CC}$ (V) | | -40 to 85 °C | | -55 to 125 °C | | |
| | | | | Min. | Max. | Min. | Max. | |
| $V_{T+}$ | Positive Input threshold | 3.0 | | 1.2 | 2.2 | 1.2 | 2.2 | V |
| $V_{T-}$ | Negative Input threshold | 3.0 | | 0.6 | 1.5 | 0.6 | 1.5 | V |
| $V_H$ | Hysteresis Voltage | 3.0 | | 0.4 | 1.2 | 0.4 | 1.2 | V |
| $V_{OH}$ | High Level Output Voltage | 2.7 to 3.6 | $I_O$=-100 µA | $V_{CC}$-0.2 | | $V_{CC}$-0.2 | | V |
| | | 2.7 | $I_O$=-12 mA | 2.2 | | 2.2 | | |
| | | 3.0 | $I_O$=-18 mA | 2.4 | | 2.4 | | |
| | | | $I_O$=-24 mA | 2.2 | | 2.2 | | |
| $V_{OL}$ | Low Level Output Voltage | 2.7 to 3.6 | $I_O$=100 µA | | 0.2 | | 0.2 | V |
| | | 2.7 | $I_O$=12 mA | | 0.4 | | 0.4 | |
| | | 3.0 | $I_O$=16 mA | | 0.4 | | 0.4 | |
| | | | $I_O$=24 mA | | 0.55 | | 0.55 | |
| $I_I$ | Input Leakage Current | 2.7 to 3.6 | $V_I$ = 0 to 5.5V | | ± 5 | | ± 5 | µA |
| $I_{off}$ | Power Off Leakage Current | 0 | $V_I$ or $V_O$ = 5.5V | | 10 | | 10 | µA |
| $I_{CC}$ | Quiescent Supply Current | 2.7 to 3.6 | $V_I$ = $V_{CC}$ or GND | | 10 | | 10 | µA |
| | | | $V_I$ or $V_O$= 3.6 to 5.5V | | ± 10 | | ± 10 | |
| $\Delta I_{CC}$ | $I_{CC}$ incr. per Input | 2.7 to 3.6 | $V_{IH}$ = $V_{CC}$ - 0.6V | | 500 | | 500 | µA |

## DYNAMIC SWITCHING CHARACTERISTICS

| Symbol | Parameter | Test Condition | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | $V_{CC}$ (V) | | $T_A$ = 25 °C | | | |
| | | | | Min. | Typ. | Max. | |
| $V_{OLP}$ | Dynamic Low Level Quiet Output (note 1) | 3.3 | $C_L$ = 50pF, $V_{IL}$ = 0V, $V_{IH}$ = 3.3V | | 0.8 | | V |
| $V_{OLV}$ | | | | | -0.8 | | |

1) Number of outputs defined as "n". Measured with "n-1" outputs switching from HIGH to LOW or LOW to HIGH. The remaining output is measured in the LOW state.

## AC ELECTRICAL CHARACTERISTICS

| Symbol | Parameter | Test Condition | | | | Value | | | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|
| | | $V_{CC}$ (V) | $C_L$ (pF) | $R_L$ (Ω) | $t_s = t_r$ (ns) | -40 to 85 °C | | -55 to 125 °C | | |
| | | | | | | Min. | Max. | Min. | Max. | |
| $t_{PLH}$ $t_{PHL}$ | Propagation Delay Time | 2.7 | 50 | 500 | 2.5 | | 6.5 | | 6.5 | ns |
| | | 3.0 to 3.6 | | | | 1.5 | 5.0 | 1.5 | 5.0 | |
| $t_{OSLH}$ $t_{OSHL}$ | Output To Output Skew Time (note1, 2) | 3.0 to 3.6 | 50 | 500 | 2.5 | | 1.0 | | 1.0 | ns |

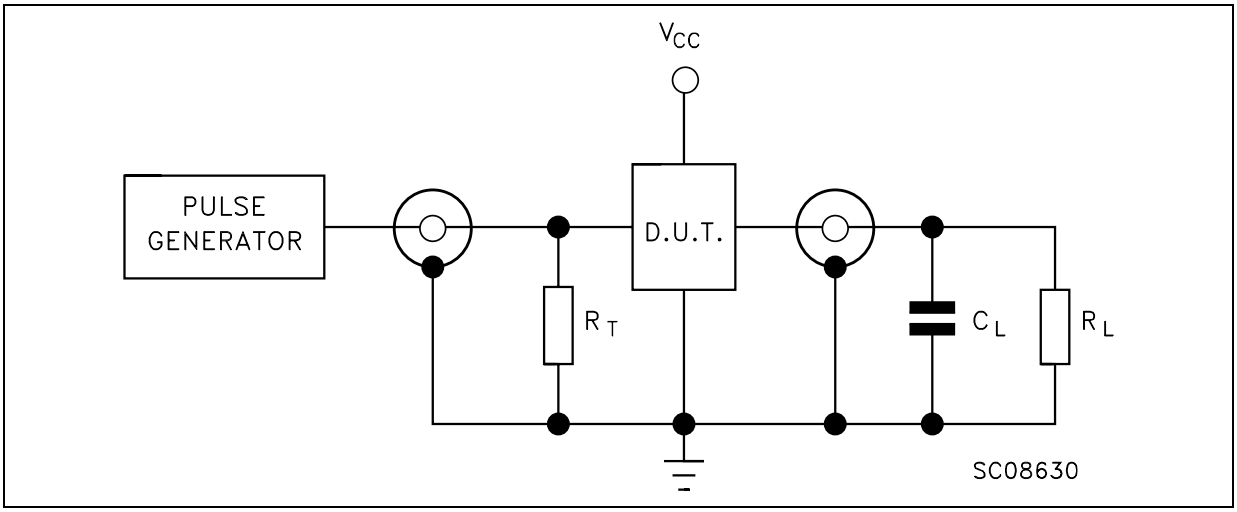
1) Skew is defined as the absolute value of the difference between the actual propagation delay for any two outputs of the same device switching in the same direction, either HIGH or LOW ($t_{OSLH} = |t_{PLHm} - t_{PLHn}|$, $t_{OSHL} = |t_{PHLm} - t_{PHLn}|$)
2) Parameter guaranteed by design

## CAPACITIVE CHARACTERISTICS

| Symbol | Parameter | Test Condition | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | $V_{CC}$ (V) | | $T_A$ = 25 °C | | | |
| | | | | Min. | Typ. | Max. | |
| $C_{IN}$ | Input Capacitance | 3.3 | $V_{IN}$ = 0 to $V_{CC}$ | | 6 | | pF |
| $C_{PD}$ | Power Dissipation Capacitance (note 1) | 3.3 | $f_{IN}$ = 10MHz<br>$V_{IN}$ = 0 or $V_{CC}$ | | 48 | | pF |

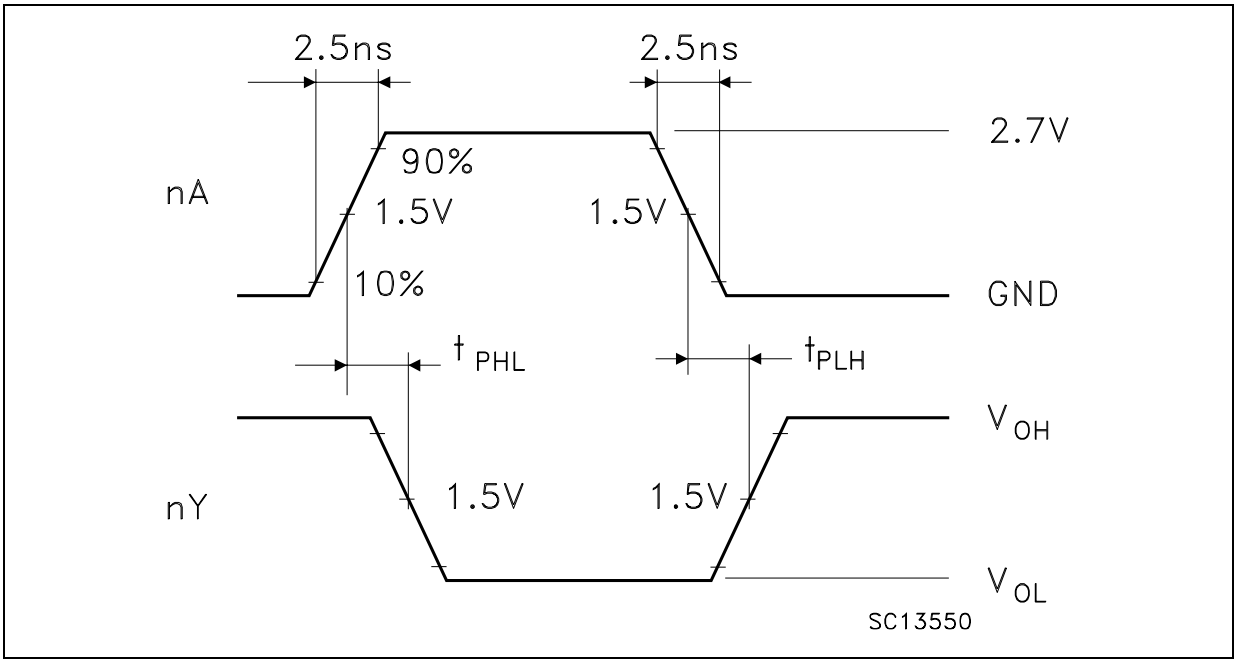
1) $C_{PD}$ is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load. (Refer to Test Circuit). Average operating current can be obtained by the following equation. $I_{CC(opr)} = C_{PD} \times V_{CC} \times f_{IN} + I_{CC}/6$ (per gate)

## TEST CIRCUIT



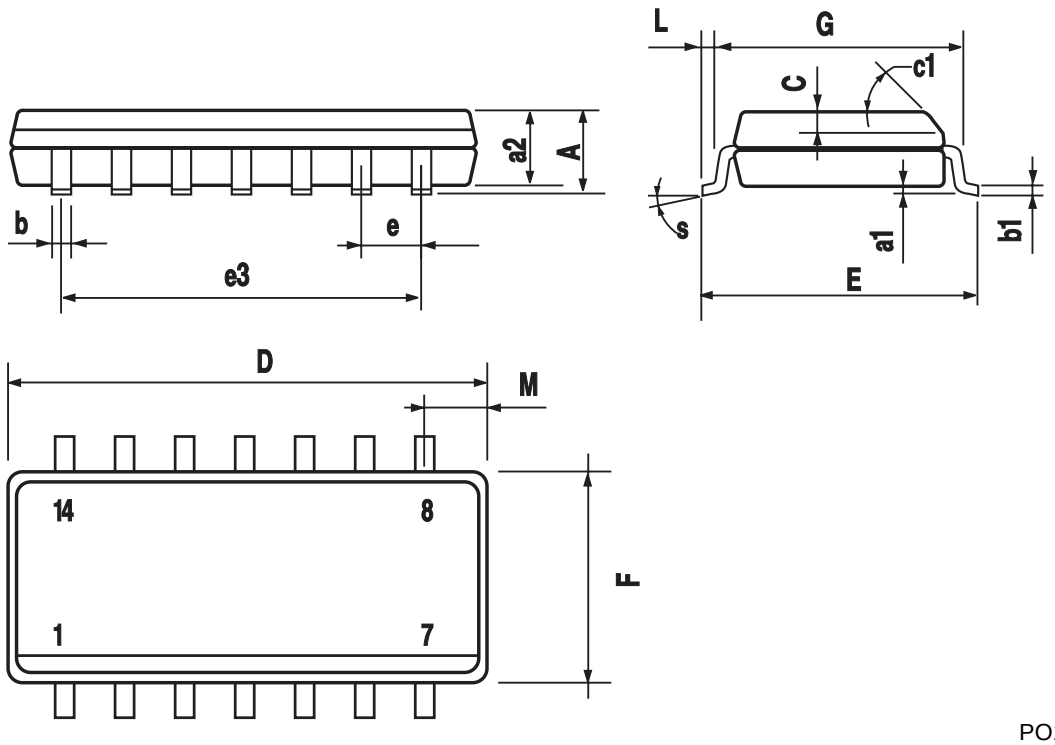

$C_L$ = 50pF or equivalent (includes jig and probe capacitance)
$R_L$ = 500Ω or equivalent
$R_T$ = $Z_{OUT}$ of pulse generator (typically 50Ω)

**WAVEFORM : PROPAGATION DELAY** (f=1MHz; 50% duty cycle)



## SO-14 MECHANICAL DATA

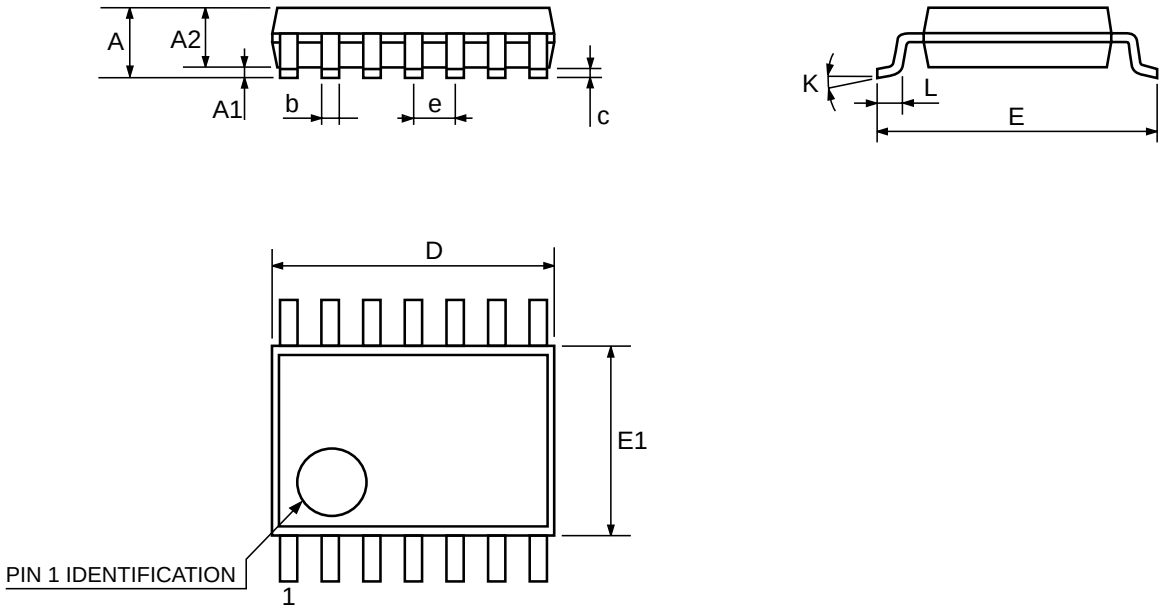
| DIM. | mm. | | | inch | | |
|---|---|---|---|---|---|---|
| | MIN. | TYP | MAX. | MIN. | TYP. | MAX. |
| A | | | 1.75 | | | 0.068 |
| a1 | 0.1 | | 0.2 | 0.003 | | 0.007 |
| a2 | | | 1.65 | | | 0.064 |
| b | 0.35 | | 0.46 | 0.013 | | 0.018 |
| b1 | 0.19 | | 0.25 | 0.007 | | 0.010 |
| C | | 0.5 | | | 0.019 | |
| c1 | 45° (typ.) | | | | | |
| D | 8.55 | | 8.75 | 0.336 | | 0.344 |
| E | 5.8 | | 6.2 | 0.228 | | 0.244 |
| e | | 1.27 | | | 0.050 | |
| e3 | | 7.62 | | | 0.300 | |
| F | 3.8 | | 4.0 | 0.149 | | 0.157 |
| G | 4.6 | | 5.3 | 0.181 | | 0.208 |
| L | 0.5 | | 1.27 | 0.019 | | 0.050 |
| M | | | 0.68 | | | 0.026 |
| S | 8° (max.) | | | | | |




PO13G

## TSSOP14 MECHANICAL DATA

| DIM. | mm. | | | inch | | |
|---|---|---|---|---|---|---|
| | MIN. | TYP | MAX. | MIN. | TYP. | MAX. |
| A | | | 1.2 | | | 0.047 |
| A1 | 0.05 | | 0.15 | 0.002 | 0.004 | 0.006 |
| A2 | 0.8 | 1 | 1.05 | 0.031 | 0.039 | 0.041 |
| b | 0.19 | | 0.30 | 0.007 | | 0.012 |
| c | 0.09 | | 0.20 | 0.004 | | 0.0089 |
| D | 4.9 | 5 | 5.1 | 0.193 | 0.197 | 0.201 |
| E | 6.2 | 6.4 | 6.6 | 0.244 | 0.252 | 0.260 |
| E1 | 4.3 | 4.4 | 4.48 | 0.169 | 0.173 | 0.176 |
| e | | 0.65 BSC | | | 0.0256 BSC | |
| K | 0° | | 8° | 0° | | 8° |
| L | 0.45 | 0.60 | 0.75 | 0.018 | 0.024 | 0.030 |



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